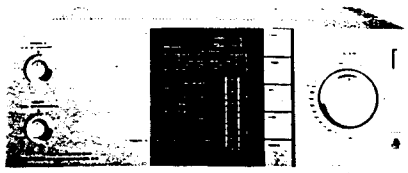
PIONEER®

Service Manual



ORDER NO.
ART-590-0

NON SWITCHING AMP
STEREO AMPLIFIER

A-9

MODEL A-9 COMES IN SIX VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	120V only	U.S.A. model
S	110V, 120V, 220V and 240V (Switchable)	General export model
S/G	110V, 120V, 220V and 240V (Switchable)	U.S. Military model
HE	220V and 240V (Switchable)	Europe model
HB	220V and 240V (Switchable)	United Kingdom model
KC	120V only	Canada model

- **This service manual is applicable to the HE and HB types.**
- **Ce manuel d'instruction se refère au mode de réglage, en français.**
- **Este manual de servicio trata del método de ajuste escrito en español.**

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1. SPECIFICATIONS

Amplifier Section

Continuous Power Output is 110 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.003% total harmonic distortion.

Continuous Power Output at 1 kHz (both channels driven)
T.H.D. 0.003%, 8 ohms ..... 120 watts per channel
Total Harmonic Distortion (20 Hertz to 20,000 Hertz, 8 ohms, from TUNER)
continuous rated power output ..... No more than 0.003%
55 watts per channel power output .. No more than 0.003%
Intermodulation Distortion (50 Hertz:7,000 Hertz = 4:1, 8 ohms, from TUNER)
continuous rated power output ..... No more than 0.005%
55 watts per channel power output .. No more than 0.003%
Damping Factor (20 Hertz to 20,000 Hertz, 8 ohms) 60
Input Sensitivity/Impedance
PHONO MM ..... 2.5 mV/50 kilohms
cartridge load capacitance:
PHONO MM ..... 100, 200, 300, 400 pF
PHONO MC ..... 0.1 mV/100 ohms
cartridge load resistance:
PHONO MC ..... 33, 100 ohms
TUNER, AUX, TAPE PLAY 1, 2 ..... 150 mV/50 kilohms
Phono Overload Level (T.H.D. 0.0015 %, 1,000 Hz)
PHONO MM ..... 250 mV
PHONO MC ..... 10 mV
Output Level/Impedance
TAPE REC 1, 2 ..... 150 mV/50 kilohms
Speaker ..... A/OFF, B/OFF (4~16 Ω)
Frequency Response
PHONO (RIAA Equalization) ..... 20 Hz to 20,000 Hz±0.2 dB
TUNER, AUX, TAPE PLAY 1, 2 ..... 5 Hz to 200,000 Hz +0 -3 dB
Tone Control
BASS ..... +10 dB/−10 dB (100 Hz, 50 Hz)
Turnover Frequency: 400 Hz/200 Hz
TREBLE ..... +10 dB/−10 dB (10 kHz, 20 kHz)
Turnover Frequency: 2.5 kHz/5 kHz
Filter
LOW (SUBSONIC) ..... 20 Hz (12 dB/oct.)
Loudness Contour (Volume control set at −40 dB position) ..... +6 dB (100 Hz), +3 dB (10 kHz)
Hum and Noise (IHF, short circuited A network)
PHONO MM ..... 90 dB
PHONO MC ..... 74 dB
TUNER, AUX, TAPE PLAY 1, 2 ..... 110 dB
Hum and Noise (DIN, continuous rated power output/50 mW)
PHONO MM ..... 80 dB/68 dB
PHONO MC ..... 75 dB/70 dB
TUNER, AUX, TAPE PLAY 1, 2 ..... 95 dB/70 dB
Muting ..... −20 dB

Miscellaneous

Power Requirements
HE, HB models ..... 220/240 V (switchable), 50/60 Hz
S, S/G models . 110/120/220/240 V (switchable), 50/60 Hz
Power Consumption
HE, HB models ..... 820 W (max.)
S, S/G models ..... 300 W (max.)
Dimensions ..... 420 (W) x 150 (H) x 430 (D) mm
16-9/16 (W) x 5-15/16 (H) x 16-15/16 (D) in
Weight (without package) ..... 16 kg (35 lb 4 oz)

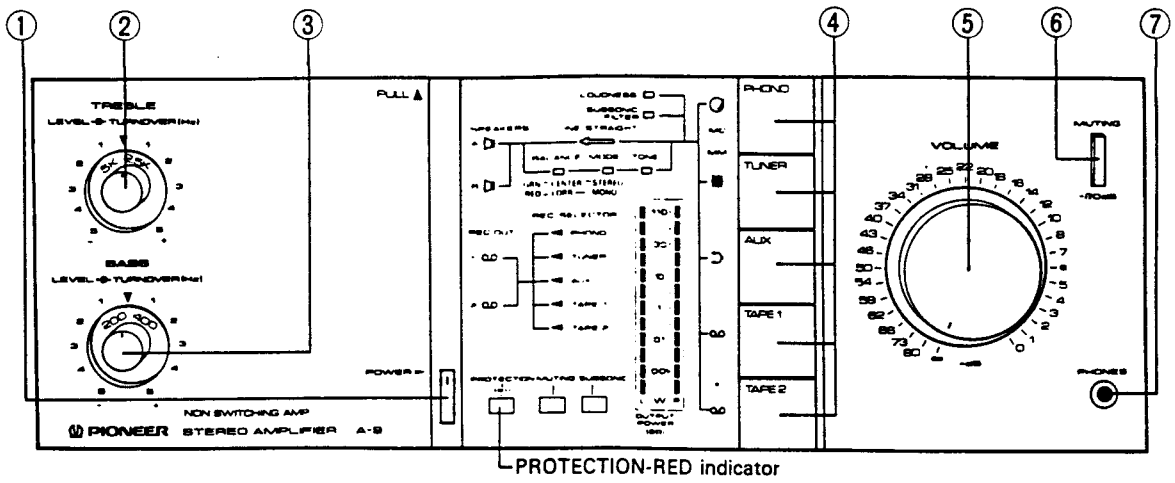
Furnished Parts

Operating Instructions ..... 1 (HE model only; 2)
Fuse (S, S/G models only) ..... 1 (10 A or 5 A)

**Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.*

NOTE:
Specifications and the design subject to possible modifications without notice due to improvements.

2. FRONT PANEL FACILITIES



① POWER SWITCH

Power is supplied to the stereo amplifier as soon as this switch is depressed to the ON position.
The power is turned off when the switch is released to the OFF position.
Immediately after the power switch has been set to ON, the muting circuit is actuated, the PROTECTION-RED indicator lights up red/and about 6 seconds after this when the muting circuit has been released, this indicator goes from red to green.

② TREBLE CONTROL

This is used to adjust the treble (high-frequency range) sound. When it is rotated clockwise from the " ▼ " position with the LINE STRAIGHT-OFF switch depressed (the TONE, MODE and BALANCE indicators light), the level of sound above the frequency selected by the TREBLE-TURNOVER switch is emphasized. Conversely, when the control is rotated counterclockwise from the " ▼ " position, the level of sound above the frequency selected by the TREBLE-TURNOVER switch is attenuated.

③ BASS CONTROL

This is used to adjust the bass (low-frequency range) sound. When it is rotated clockwise from the " ▼ " position with the LINE STRAIGHT-OFF switch depressed (the TONE, MODE and BALANCE indicators light), the level of sound below the frequency selected by the BASS-TURNOVER switch is emphasized. Conversely, when the control is rotated counterclockwise from the " ▼ " position, the level of sound below the frequency selected by the BASS-TURNOVER switch is attenuated.

④ FUNCTION SWITCHES

These are used to select the sound source. At the left of each switch is a function indicator (pictographic) which lights when the corresponding switch has been depressed. This indicates that the lighted function has been selected.

PHONO: Depress for playing records on a turntable connected to the PHONO jacks.

TUNER: Depress for listening to a program on a tuner connected to the TUNER jacks.

AUX: Depress for listening to the sound from a stereo component connected to the AUX jacks.

TAPE 1: Depress to listen to a tape in a tape deck connected to the TAPE-1 jacks or to monitor a recording.

TAPE 2: Depress to listen to a tape in a tape deck connected to the TAPE-2 jacks or to monitor a recording.

NOTE:
Depress only one FUNCTION switch at a time. The desired program source may not be selected if two or more switches are depressed at the same time.

⑤ VOLUME CONTROL

This is used to adjust the volume of sound heard through the speakers or headphones. The scale gives the attenuation when the rated output power is 0 dB. No sound is heard when it is set to the "∞" position. To increase the volume, rotate this control slowly clockwise (↻).

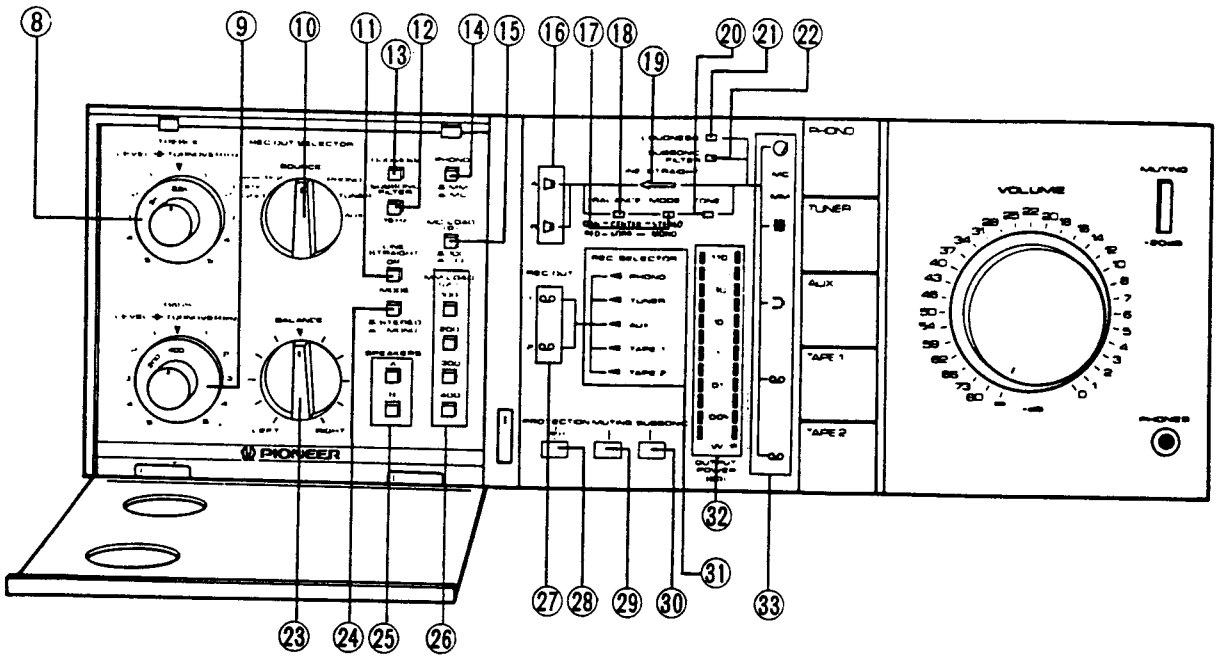
⑥ MUTING –20 dB SWITCH

The volume is attenuated by –20 dB when this switch is depressed to the ON position (MUTING indicator lights). The switch can be used effectively when the stylus descends onto the record during record play, when the sound is to be turned down temporarily and when you want to adjust the sound precisely as you listen to a program source under low sound level conditions.

⑦ PHONES JACK

Connect the plug on your headphones to this jack when listening to a program in private.

To listen to a program through the headphones, release both the SPEAKERS A and B switches.



⑧ TREBLE-TURNOVER selector switch

This is used to select the frequency at which the TREBLE control starts to have an effect on the tone quality when it is used for adjustment.

2.5 k: Allows the frequency band above 2.5 kHz to be adjusted.

5 k: Allows the frequency band above 5 kHz to be adjusted.

⑨ BASS-TURNOVER SELECTOR SWITCH

This is used to select the frequency at which the BASS control starts to have an effect on the tone quality when it is used for adjustment.

400: Allows the frequency band below 400 Hz to be adjusted.

200: Allows the frequency band below 200 Hz to be adjusted.

⑩ REC OUT SELECTOR SWITCH

This is used to select the output signal which is fed out to the TAPE REC jacks.

COPY 2 ► 1: The output signal is fed out from the TAPE 2 PLAY jacks to the TAPE 1 REC jacks (when dubbing a tape from TAPE 2 to TAPE 1).

COPY 1 ► 2: The output signal is fed out from the TAPE 1 PLAY jacks to the TAPE 2 REC jacks (when dubbing a tape from TAPE 1 to TAPE 2).

SOURCE: The output signal of the program source (PHONO, TUNER, AUX, etc.) selected by the FUNCTION switch is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

PHONO: The output signal from the PHONO jacks is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

TUNER: The output signal from the TUNER jacks is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

AUX: The output signal from the AUX jacks is fed out to the TAPE 1 REC and TAPE 2 REC jacks.

⑪ LINE STRAIGHT-OFF SWITCH

When this switch is released to the ON position (the LINE STRAIGHT indicator lights), the signal from the input jacks is directly sent to the power amplifier input without passing through the tone control circuit. When this switch is depressed to the OFF position, the input signal's tone quality can be adjusted with the tone controls.

⑫ SUBSONIC 15 Hz FILTER SWITCH

Depressing this switch to the ON position actuates the subsonic filter with the 15 Hz cutoff frequency. Once the SUBSONIC FILTER indicator has lighted, it means that noise has been detected. Depress the SUBSONIC FILTER switch. This filter serves to attenuates frequencies lower than 15 Hz with a 12 dB/oct slope and, therefore, it can be used to suppress the ultra-low-range noise which is generated by record warp and other factors. This noise cannot actually be heard by the ear but it can cause cross modulation distortion and even speaker damage. Use this switch when required during record play.

⑬ LOUDNESS SWITCH

The bass and treble sound is emphasized when this switch is depressed to the ON position (LOUDNESS indicator lights) under low volume listening conditions.

When the volume of sound is low, the capability of the ear to pick up the bass and treble sound drops off, compared with high volume listening conditions. The LOUDNESS switch compensates for this characteristic of the ear. The bass and treble are emphasized when the switch is set to ON and the sound comes alive even when the volume is low.

⑭ PHONO MM/MC SELECTOR SWITCH

This switch is set to the position that corresponds to the type of cartridge being used when listening to a record on a turntable connected to the PHONO jacks.

- MM: Set here when using an MM cartridge.
- MC: Set here when using an MC cartridge.

NOTE:
Some MC cartridges on the market have the same high output power as MM cartridges. Consult the instructions accompanying the cartridge.

⑮ MC LOAD (Ω) SWITCH

This switch is set to the position that corresponds to the output impedance of the MC (moving coil) cartridge being used for record play.

⑯ SPEAKERS A/B INDICATORS

These light when one of the SPEAKERS switches has been depressed.

⑰ MODE INDICATOR

This lights up green (STEREO) or red (MONO) in accordance with the selected position of the MODE selector.

⑱ BALANCE INDICATOR

Depending on the position of the BALANCE control, this lights up green (when the control is at the CENTER position) or red (when it is rotated LEFT or RIGHT position).

⑲ LINE STRAIGHT INDICATOR

This lights when the LINE STRAIGHT-OFF switch has been released to ON in place of the BALANCE, MODE and TONE indicators.

⑳ TONE INDICATOR

This lights when the tone control circuitry has been actuated.

㉑ LOUDNESS INDICATOR

This lights when the LOUDNESS switch has been set to ON.

㉒ SUBSONIC FILTER INDICATOR

This lights when the SUBSONIC FILTER switch has been set to ON.

㉓ BALANCE CONTROL

This is used to adjust the balance of the sound from the left and right channels. When rotated clockwise from its center position, the volume of the left (L) channel is reduced; when rotated counterclockwise, the volume of the right (R) channel is reduced.
To adjust the balance, first set the BALANCE control to its center position, set the MODE selector to MONO and rotate the control so that the sound seems to be coming from the midpoint between the left and right speakers.

㉔ MODE SELECTOR

This is used to select the mode.

- **STEREO:** Set here for ordinary stereo listening.
- **MONO:** Set here to mix the left and right channel stereo input signals and hear them in mono through both the left and right speakers.

㉕ SPEAKERS SWITCHES

These are used to select the speakers through which you will listen to the sound. When one of the switches is depressed, the corresponding speaker indicator will light to indicate that the selected speakers are now working.

- A: The sound is heard from the speakers connected to the speaker A terminals.
- B: The sound is heard from the speakers connected to the speaker B terminals.

No sound will be heard when SPEAKERS A and B switches are both released. This is the position at which the sound can be heard through the headphones.

㉖ MM LOAD (pF) SWITCH

This switch is set to the position that corresponds to the designated load capacitance of the MM (moving magnet) cartridge being used for record play.

㉗ REC OUT 1, 2 INDICATORS

These indicate the tape deck which is recording in accordance with the position selected by the REC OUT SELECTOR switch.

㉘ PROTECTION-RED INDICATOR

This lights in red or green, depending on the operating mode of the power protection circuit.

㉙ MUTING INDICATOR

This lights in accordance with the position of the MUTING −20 dB switch.

㉚ SUBSONIC DETECTION INDICATOR

This lights upon detection of ultra-low-frequency noise components generated by record warp and other factors or any other noise contained in the program source. When it has lighted, depress the SUBSONIC FILTER switch to the ON position. The indicator goes off at the ON position.

㉛ REC SELECTOR INDICATOR

This indicates the program source (PHONO, TUNER, AUX, etc.) being recorded in accordance with the position of the REC OUT SELECTOR switch.

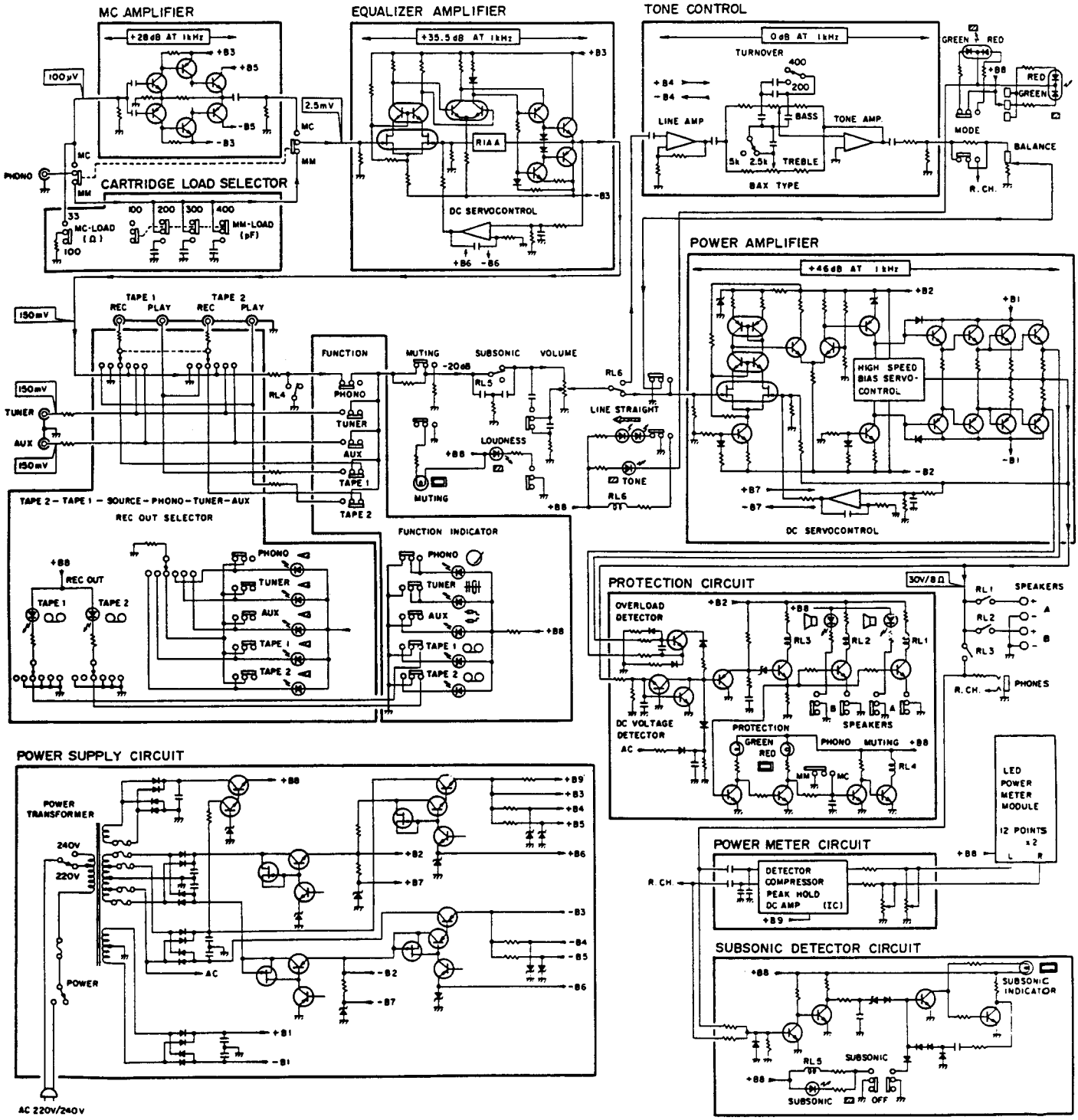
㉜ OUTPUT POWER 8 Ω METER

This indicates the output level when speakers with an 8-ohm impedance are connected to the speaker terminals. L is for the left channel and R for the right channel.

㉝ FUNCTION INDICATORS

The indicator corresponding to the selected FUNCTION switch lights.

3. BLOCK DIAGRAM



4. CIRCUIT DESCRIPTIONS

4.1 AMPLIFIER SECTION

Cartridge Load Selector

When the PHONO MM switch is placed to the ON position, the MM LOAD (C) switch may be positioned to provide four different levels of input capacitance (100pF, 200pF, 300pF, 400pF) in the phono input circuit. The input impedance of the equalizer amplifier is set at 50kΩ/100pF, and operating the MM LOAD (C) switch places capacitors in parallel configuration in the input circuit.

When the PHONO MC switch is placed to the ON position, operating the MC LOAD (R) switch places input resistance into the phono input circuit to provide two different levels (33Ω, 100Ω) of cartridge loading.

MC Amplifier

To provide compatibility with low-output moving-coil cartridges, the MC amp is a flat-response voltage amplifier with a gain of 28dB. This amplifier is switched into the before stage of the equalizer amplifier by the PHONO MC switch being placed to the ON position. Circuitry is completely symmetrical, and consists of 3-stages with direct coupling. The first stage uses ultra-low noise NPN and PNP transistors, and an S/N ratio of 74dB (100μV input, IHF-A) is attained.

Equalizer Amplifier

The first stage is a cascade connected differential amp using an ultra-low noise twin FET and NPN twin transistor. The second stage differential amp, in combination with the modified current mirror of the third stage serves to cancel even-harmonic distortion components, and the output stage is a class A configuration symmetrical complementary SEPP.

A DC servocontrol circuit is also built into the equalizer amplifier. This circuit serves to hold DC area gain of the equalizer amplifier to less than 1, so that even when an extremely low frequency is input into the amp, it is practically eliminated from the output. This circuit also functions to minimize DC drift at the output mid-point. Output is returned to the input stage through the integrating amp (consisting of operational amplifier IC μPC741C), holding circuit gain in the DC area to less than 1.

Using FETs in the first stage, combined with the DC servocontrol function eliminates the need for coupling capacitors between inputs and outputs, and there is no sound degradation due to capacitors.

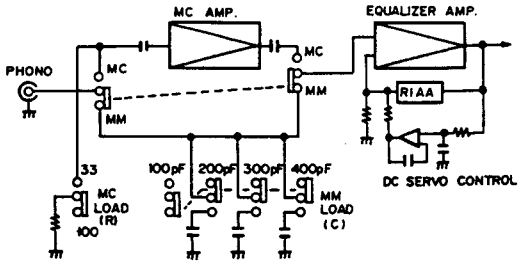


Fig. 4-1 Cartridge load selector circuit

Tone Control

Tone control is by a BAX type tone control circuit with a turnover frequency selector. To improve S/N ratio, a line amp has been added to the before stage. Both line amp and tone amp use operational amplifiers (IC μPC4558DX).

An attenuator is used in the output circuit to equalize the level with the line straight circuit. This brings the total gain of the tone control section to 0dB.

Line Straight Circuit

When the LINE STRAIGHT OFF switch is in the LINE STRAIGHT position, the tone control circuit (including line amp), MODE (STEREO/MONO) switch, and BALANCE control are bypassed, and the signal circuit is directly coupled from the VOLUME control to the power amp for pure DC amplification.

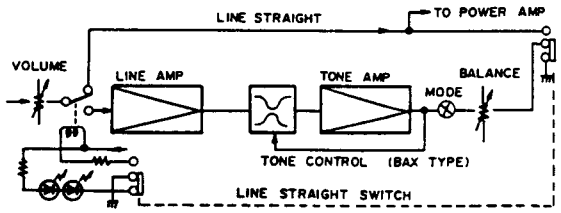


Fig. 4-2 Line straight circuit

Power Amplifier

The input stage is a cascade connected differential amplifier using a low noise twin FET and an NPN twin transistor, and the load circuit is the current mirror type. The power stage is a 3-stage Darlington arrangement, with the final stage a parallel SEPP.

Bias voltage is supplied to the power stages through the high speed bias servocontrol circuit. The B class push-pull power stage alternately drives the N and P channels during each helf-cycle, and the high speed bias servocontrol circuit controls the bias voltage so that the idle channel of the power stage is maintained in the active region. (Refer to the section on the High Speed Bias Servocontrol Circuit for operational details.)

The power amplifier has a built in DC servocontrol circuit functioning to reduce gain in the DC area to less than 1, so that even if a DC input were present, it would, for all practical purposes, not appear at the output. This circuit also functions to hold center-point DC drift to a minimum. The signal is returned from the output stage to the input stage via the integrating amp (constructed of an operational amplifier), and circuit gain in the DC area is held to less than 1.

The use of FETs in the first stage, combined with the DC servocontrol circuit eliminate the need for coupling capacitors between inputs and outputs, thereby preserving tonal quality.

- High Speed Bias Servocontrol Circuit

By operating the power stage only within the active region (no possible cut-off) and with minimum idle current, the high speed bias servocontrol circuit prevents the generation of switching distortion and reduces heat loss.

This circuit is outlined in Fig. 4-4 . When there is no signal applied to the circuit, Q1 and Q2 are almost cut off, while Q3 and Q4 will be on. The voltage across the collector and base of both of these transistors (Q3 and Q4) at this time may be disregarded. Consequently, with the power stage bias circuit consisting of 4 PN junctions formed by Q3, D3 and Q4, and VR1.

With R1 and D1 ensuring a constant flow of current, the base of Q1 and point X may be brought to the same level on an AC basis (level fluctuations due to the signal) by a simple shift in DC level. Furthermore, Q1 may be considered emitter-follower with R3 as the emitter resistance.

When the voltage across points Y and X is increased by the positive portion of the signal applied to this circuit, it becomes the input signal of this emitter-follower (Q1). Since the emitter-follower voltage gain is practically 1, a voltage more or less equal to that of the input signal (that is, the voltage increase across points Y and X) is produced at R3. And the R3 voltage is the voltage applied across the base and collector of Q3 which forms part of the power stage bias circuit. So the bias voltage applied to Q3 will be in excess by the same amount the voltage across points Y and X is increased (by positive portion of the signal) above the voltage level when no signal is being applied. Consequently, the increase in voltage across points Y and X cancels the decrease in voltage across points X and Z, thereby maintaining the idle current without cutting the PNP power stage off (noting that there actually is a slight decrease in current). For the negative portions of the signal, Q2 and Q4 are operated in the same manner, thereby preventing the NPN power stage form being cut off.

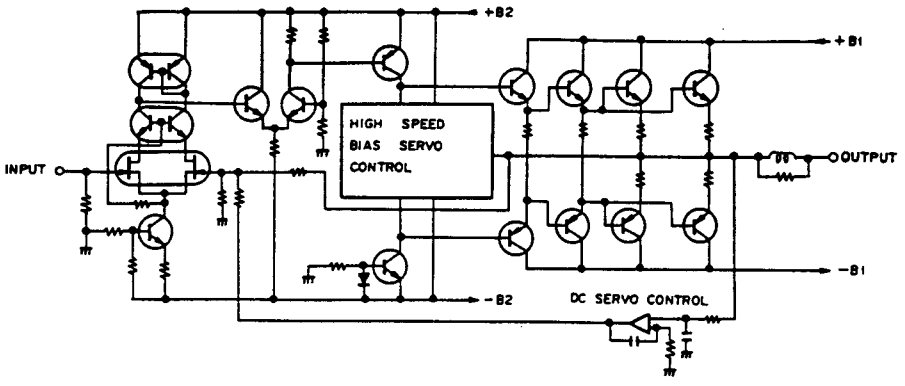


Fig. 4-3 Power amplifier circuit

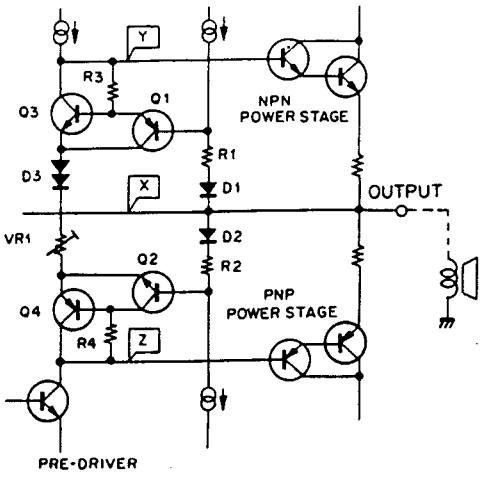


Fig. 4-4 Basic circuitry of High speed bias servocontrol circuit

4.2 POWER INDICATOR CIRCUIT

The A-9 indicates power output from 0.01 watt to 110 watts peak power using a 12 point LED display without range switching. The power amplifier output signal is passed through a low-pass filter, then input to IC (TA7318P-A). This IC consists of a detector circuit, compressor (40dB), and peak-hold circuit for each channel. The signal, after being processed by this IC, is input to the LED power meter module containing the voltage comparators and LED drivers. Here, the LEDs are driven (illuminated) in accordance with the input level.

4.3 PROTECTION CIRCUIT

The purpose of this circuit is to protect both the speakers and the power amplifiers. The relay in the output circuit is automatically opened in any of the following cases:

1. During the "transient operations" when the power supply is turned on and off.
2. Upon detection of a DC voltage in the output circuit, caused by component failure or accident.
3. Upon detection of an overload, caused by a short circuit in the load.

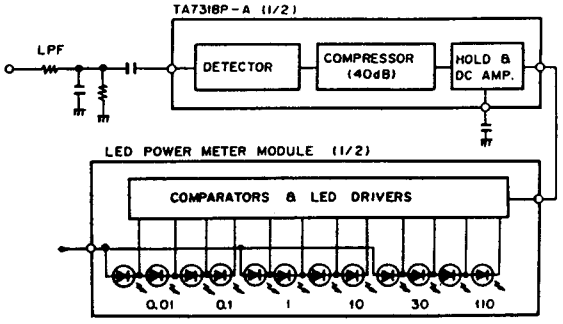


Fig. 4-5 Power indicator circuit

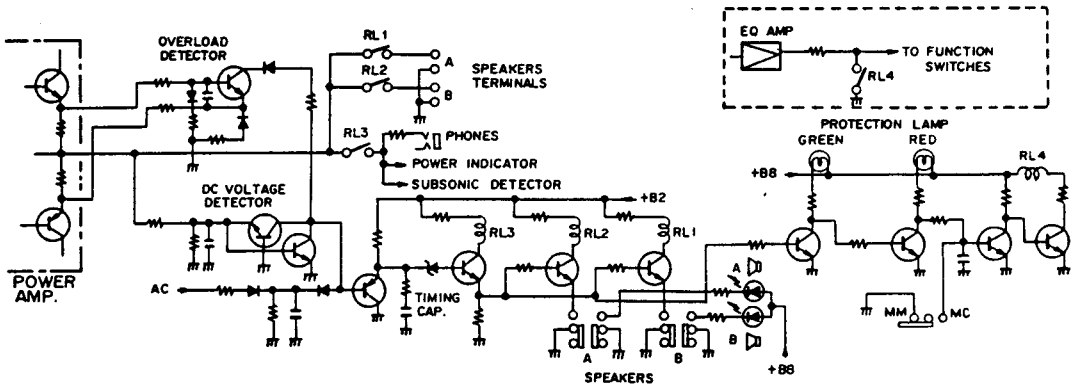
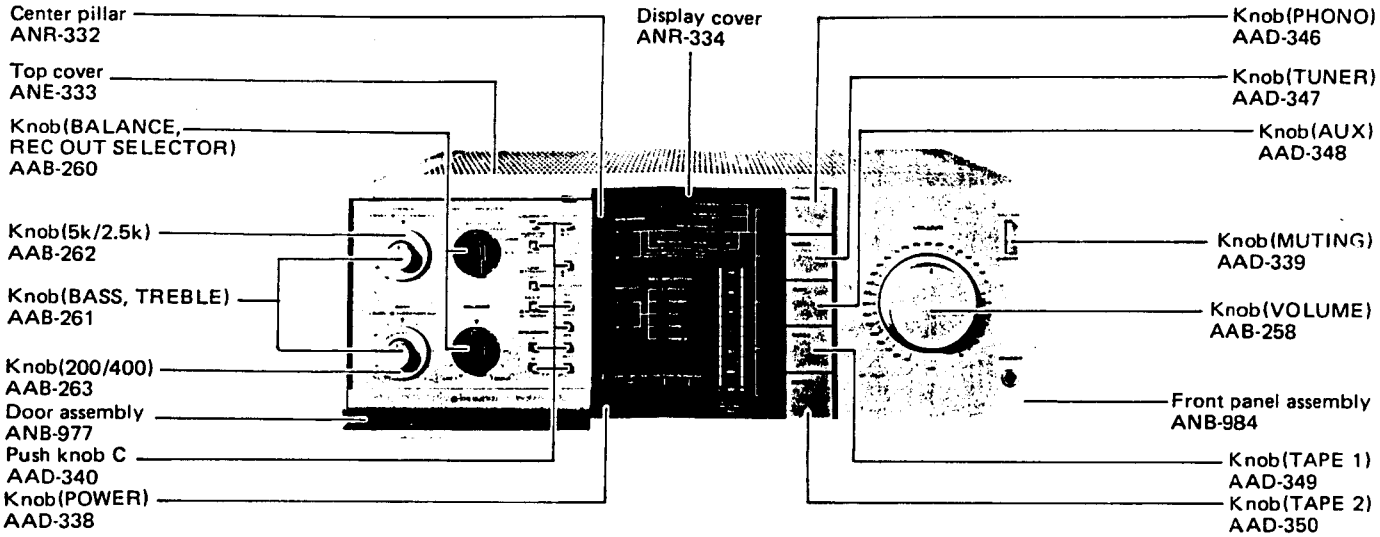


Fig. 4-6 Protection circuit

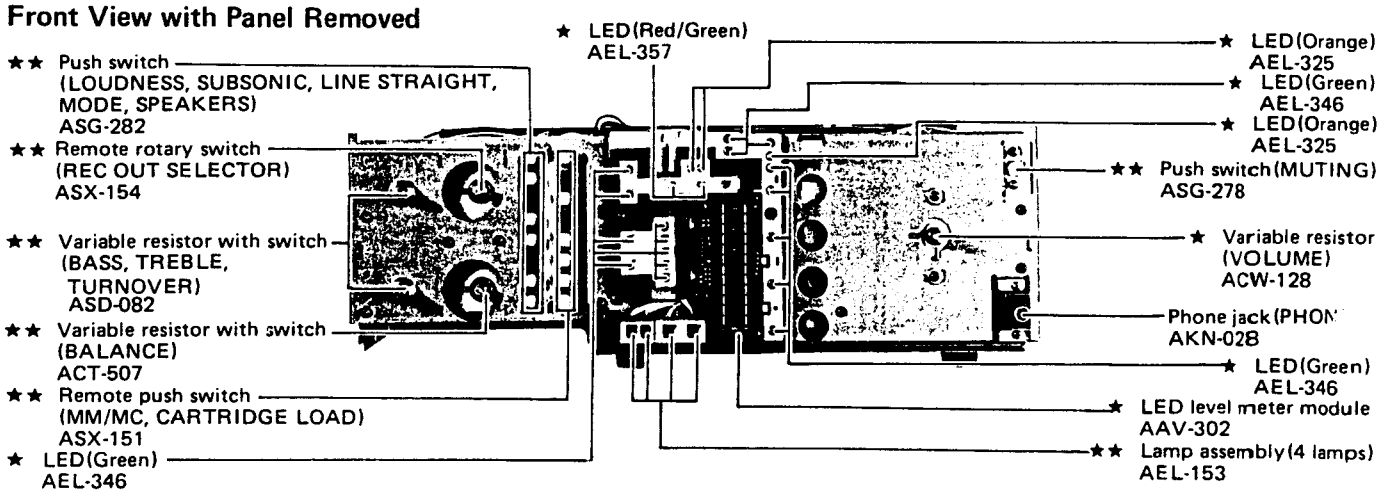
5. PARTS LOCATION

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

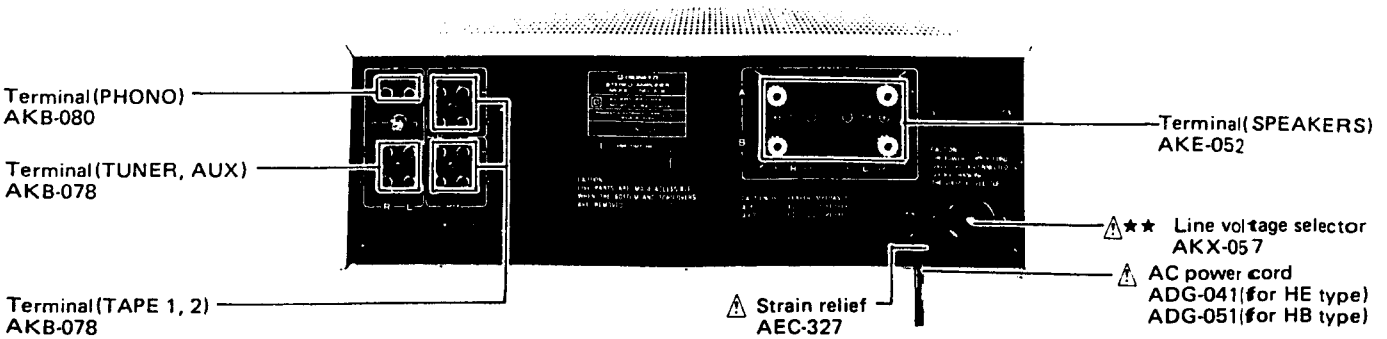
Front Panel View



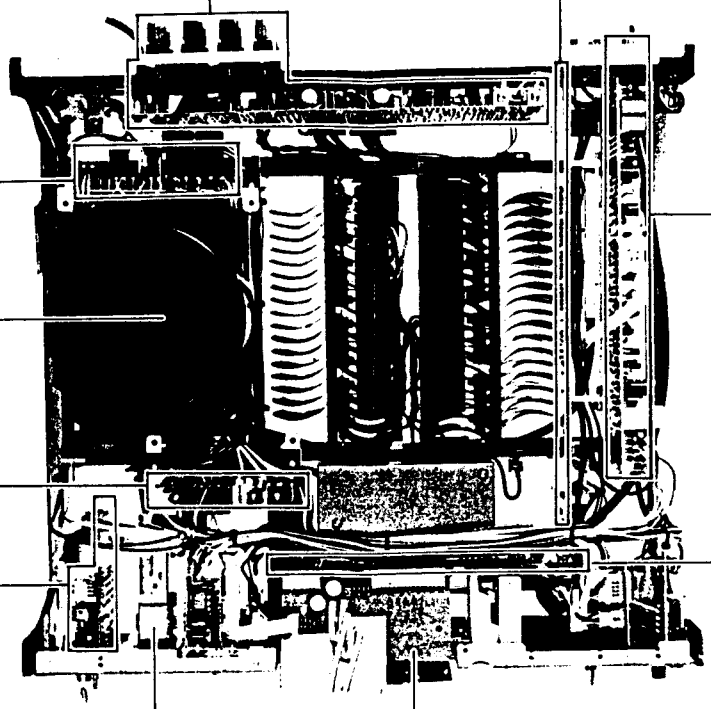
Front View with Panel Removed



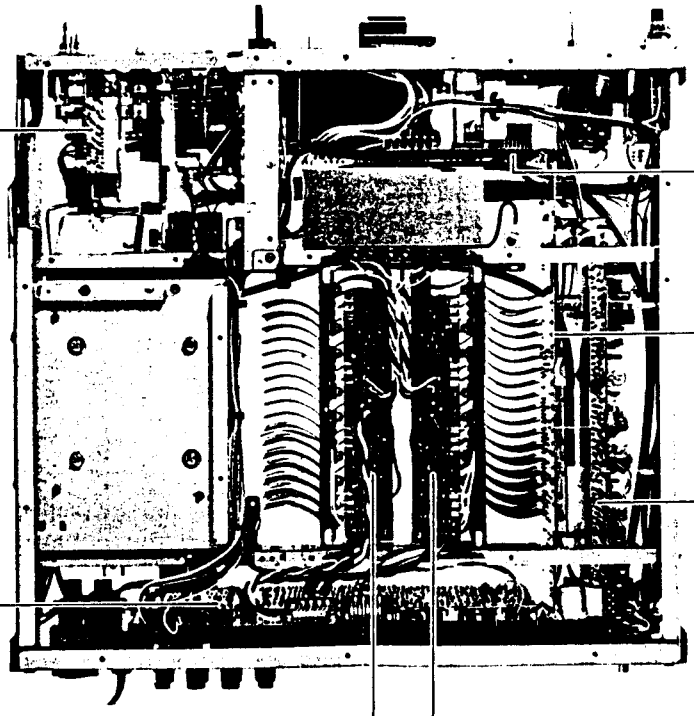
Rear Panel View



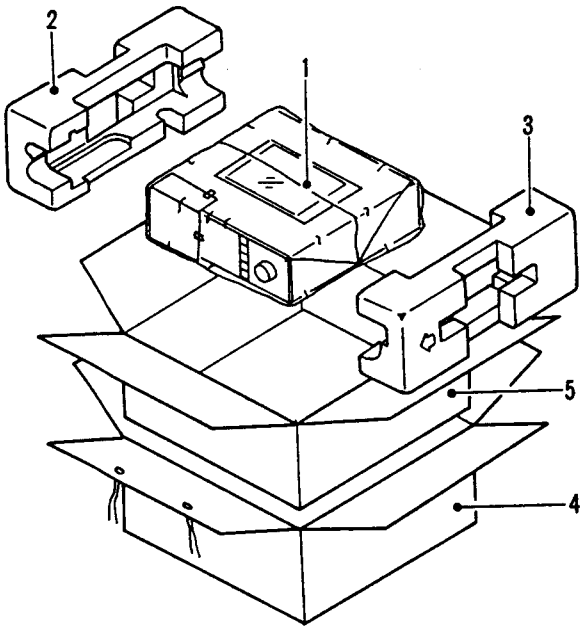
Top View



Bottom View



6. PACKING



Mark	No.	Part No.	Description
	1.	ARB-399	Operating instructions (English)
		ARD-156	Operating instructions (German/French/Italian, HE type only)
	2.	AHA-279	Side pad L
	3.	AHA-280	Side pad R
	4.	AHD-874	Packing case
	5.	AHC-063	Inside packing

POWER AMP Ass'y
GWH-148

CONNECTOR
Ass'y (I)

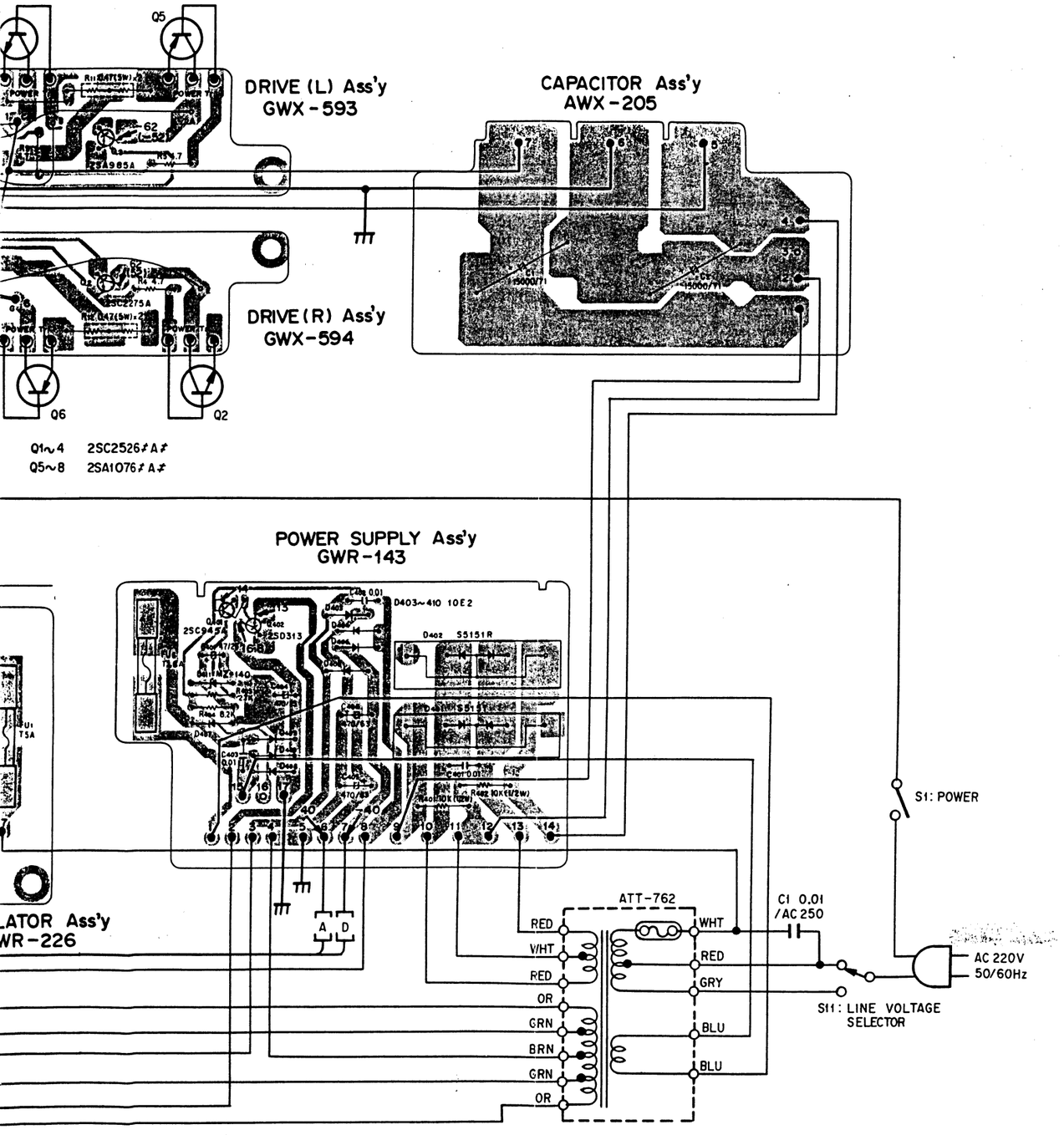
CONNECTOR
Ass'y (J)

CONNECTOR
Ass'y (G)

INDICATOR Ass'y
GWX-585

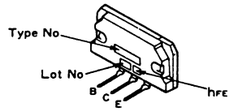
LED-LEVEL-METER-MODULE
AAV-302

REGULATOR Ass'y
AWR-226



External Appearance of Transistors and ICs

2SA1076/A/
2SC2526/A/



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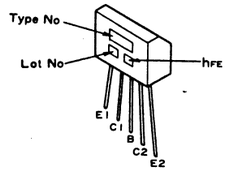

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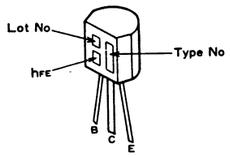
2SA850
2SC1915
2SC1735



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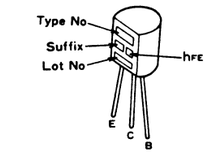
2SC1775A
2SC1890A



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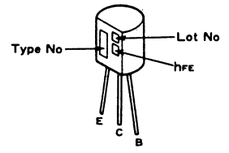
2SC1400



2SA899A
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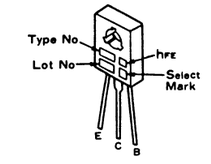

2SA733A
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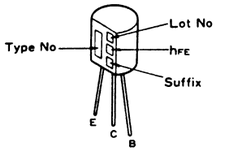

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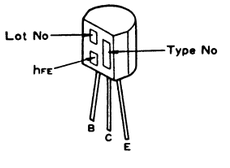
2SA978
2SC2575
2SC2602



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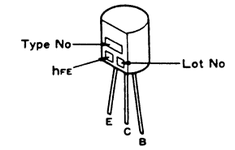

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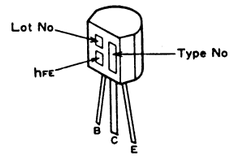

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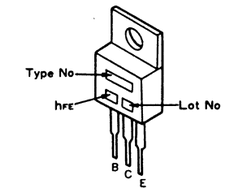

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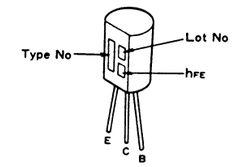
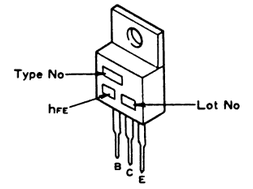


2SB507



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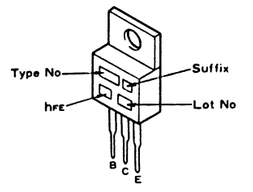
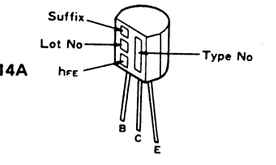


2SC1914A



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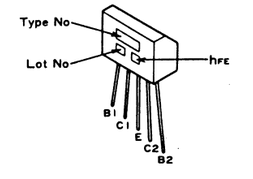

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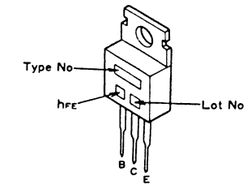

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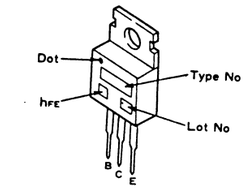

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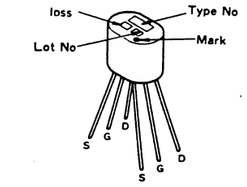
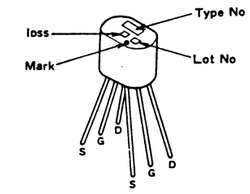
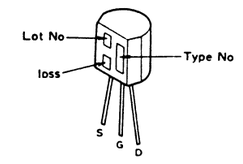


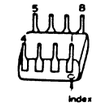
2SK194



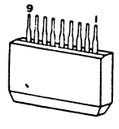
2SK34



μPC4558C
NJM4558DX
μPC471C



TA7318P



TONE CONTROL Ass'y
GWG-154

VOLUME CONTROL Ass'y

SWITCH Ass'y

FM MUTING Ass'y

CONNECTOR
Ass'y (D)

CONNECTOR
Ass'y (E)

CONNECTOR
Ass'y (F)

HEADPHONES JACK Ass'y

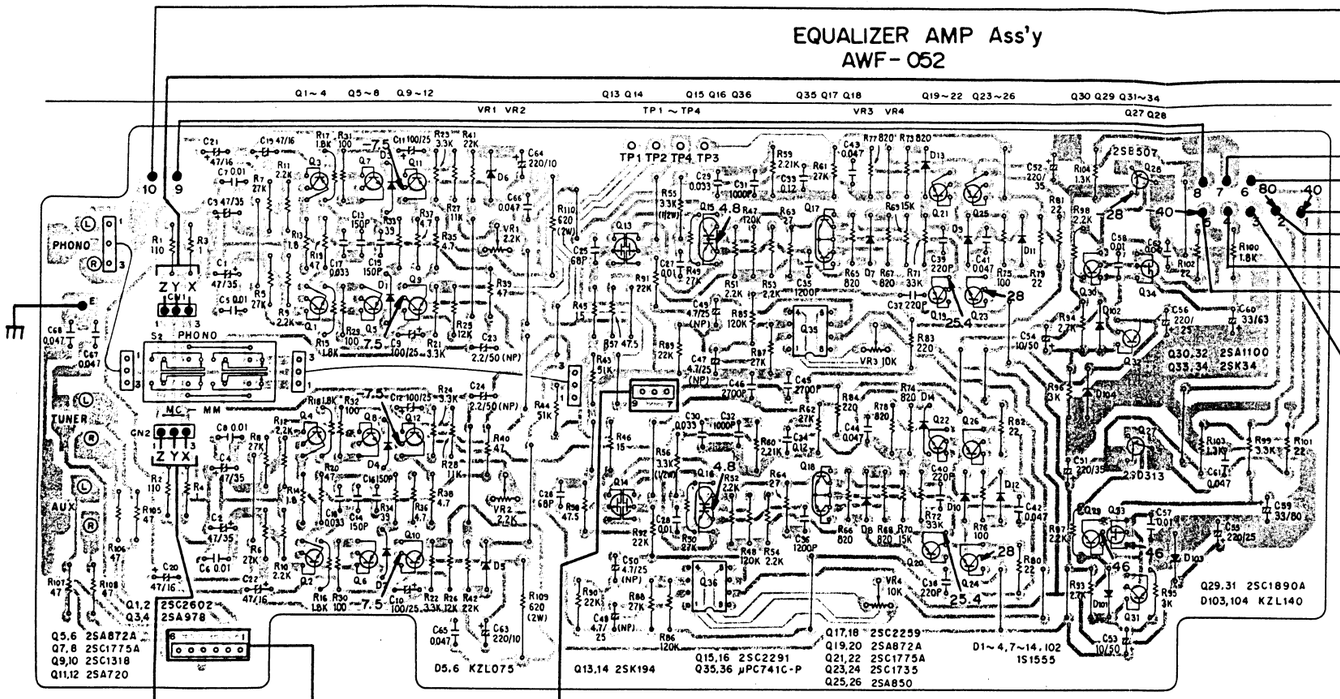
BALANCE CONTROL
Ass'y

PL1 (RED)
(PROTECTION)
PL2 (GREEN)
PL3
(MUTING)
PL4
(SUBSONIC)

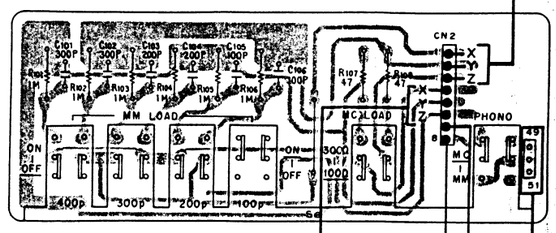
PL1∿4: LAMP Ass'y
8V 50mA

7. P.C. BOARDS CONNECTION DIAGRAM

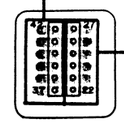
EQUALIZER AMP Ass'y
AWF-052

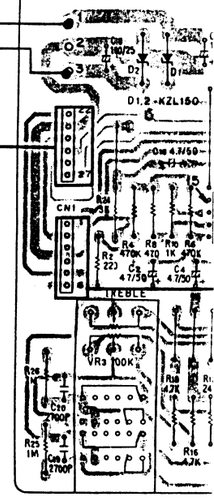


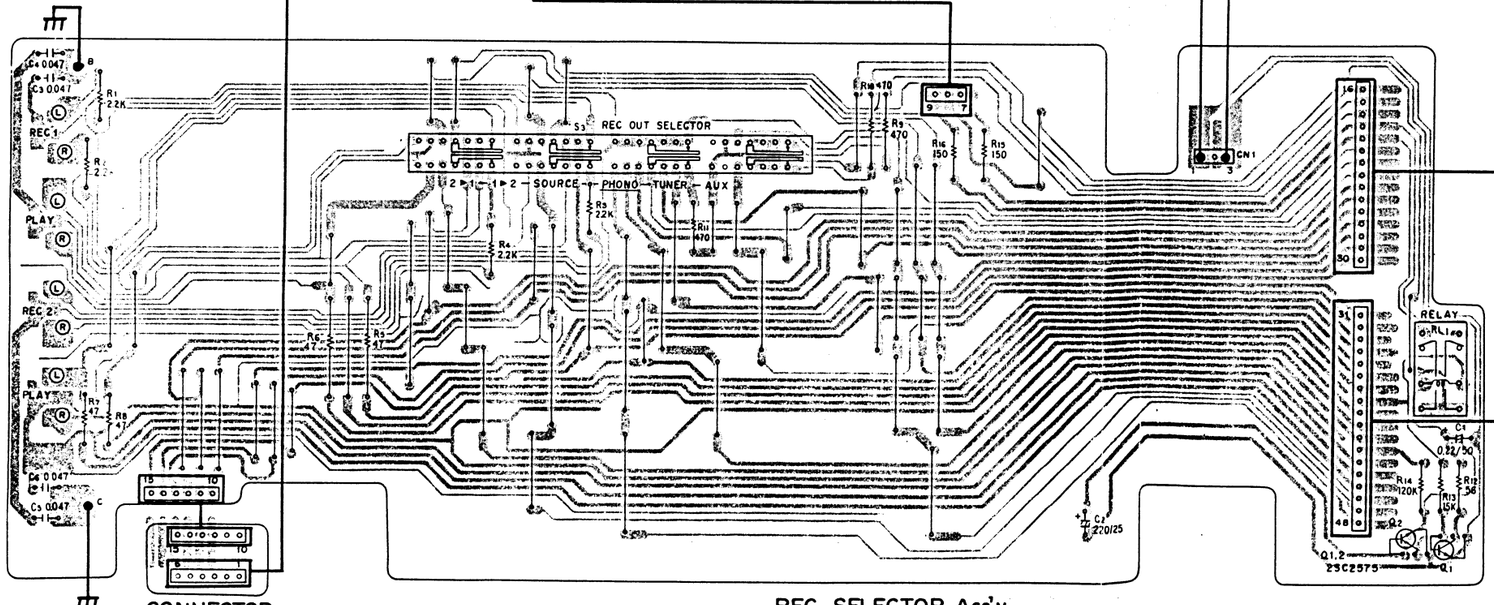
LOAD SELECTOR Ass'y



CONNECTOR
Ass'y (H)





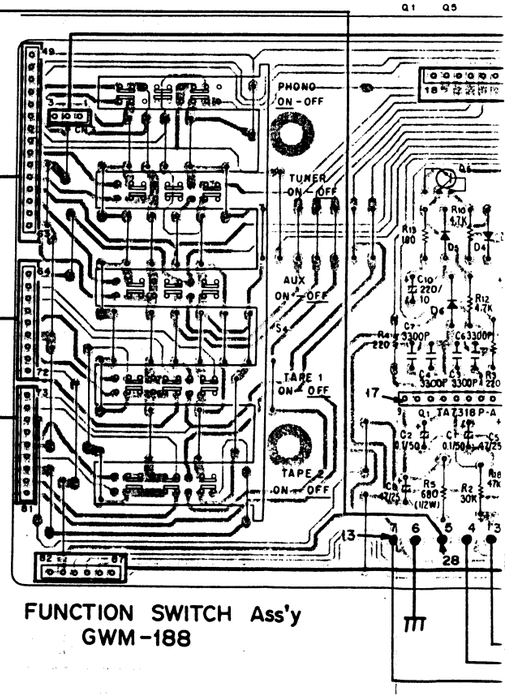


CONNECTOR
Ass'y (A)

REC SELECTOR Ass'y
GWS-303

CONNECTOR
Ass'y (B)

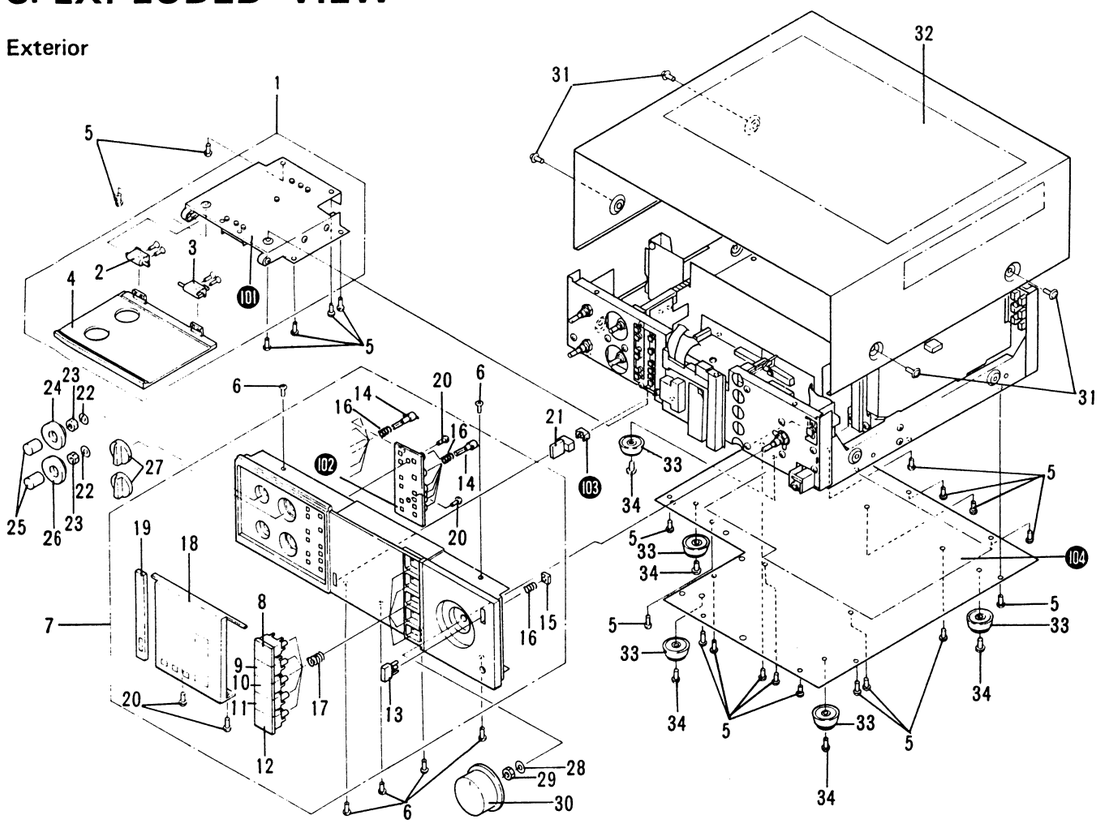
CONNECTOR
Ass'y (C)



FUNCTION SWITCH Ass'y
GWM-188

8. EXPLODED VIEW

Exterior



Exterior Components

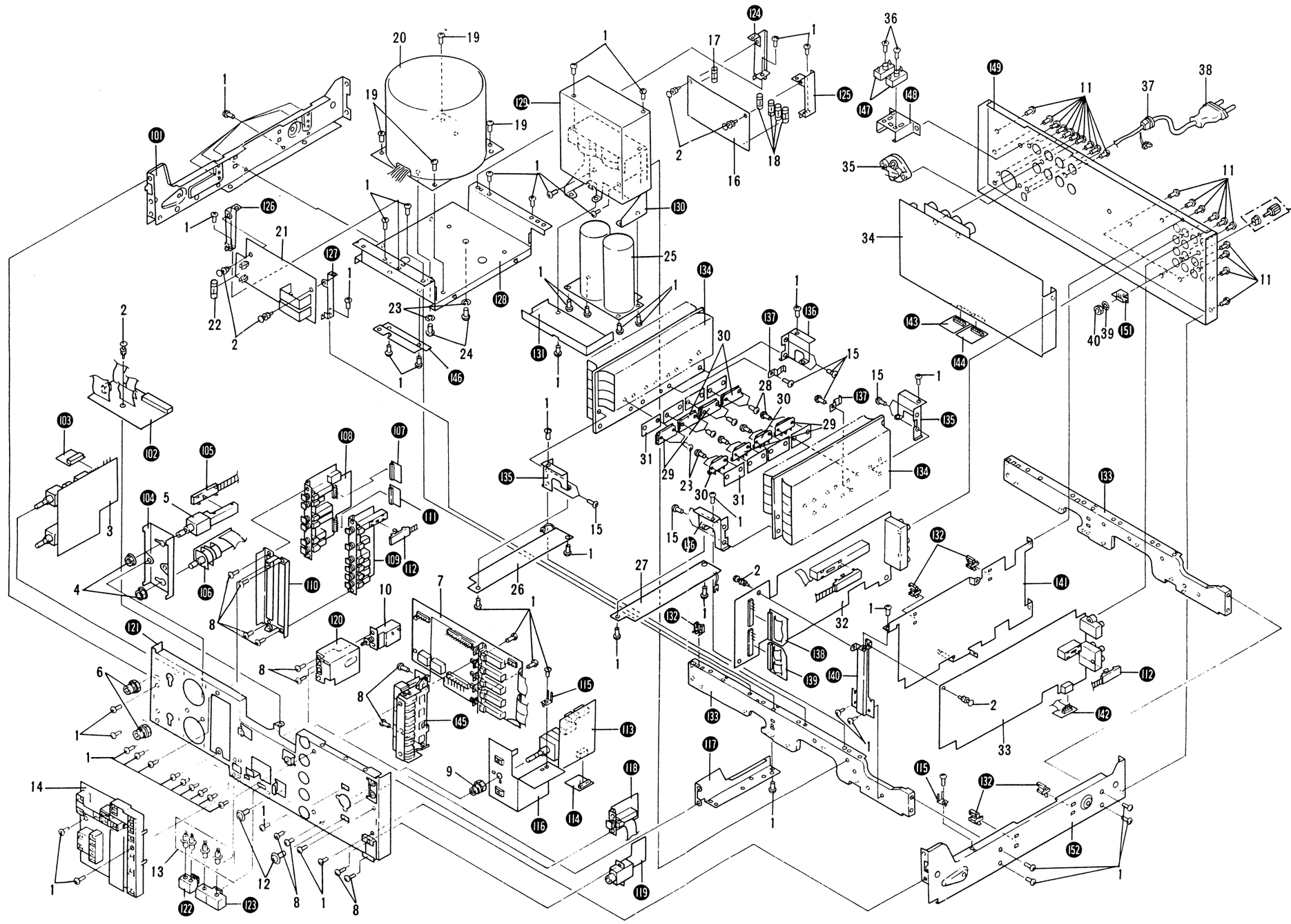
Mark	No.	Part No.	Description
	1.	AXC-003	Door mechanism assembly
	2.	ANR-340	Hinge L
	3.	ANR-341	Hinge R
	4.	ANB-977	Door assembly
	5.	VBZ30P060FMC	Screw 3x6
	6.	VBZ30P080FMC	Screw 3x8
	7.	ANB-984	Front panel assembly
	8.	AAD-346	Knob(PHONO)
	9.	AAD-347	Knob(TUNER)
	10.	AAD-348	Knob(AUX)
	11.	AAD-349	Knob(TAPE 1)
	12.	AAD-350	Knob(TAPE 2)
	13.	AAD-339	Knob(MUTING)
	14.	AAD-340	Push knob C
	15.	AEC-564	Knob holder
	16.	ABH-045	Coiled spring
	17.	ABH-069	Coiled spring
	18.	ANR-334	Display cover
	19.	ANR-332	Center pillar
	20.	VBZ30P080FZK	Screw 3x8
	21.	AAD-338	Knob(POWER)
	22.	WAX1F160U050	Washer 11φ
	23.	NKX1FUC	Nut M11
	24.	AAB-262	Knob(5k/2.5k)
	25.	AAB-261	Knob(BASS, TREBLE)
	26.	AAB-263	Knob(200/400)
	27.	AAB-260	Knob(BALANCE, REC OUT SELECTOR)
	28.	WA92F140U100	Washer 9.2φ
	29.	NK90FUC	Nut M9
	30.	AAB-258	Knob(VOLUME)
	31.	ABA-193	Screw
	32.	ANE-333	Top cover
	33.	AEC-083	Cabinet bumper
	34.	VTZ40P120FMC	Screw 4x12
	101.		Door holder
	102.		Knob spacer
	103.		Flexible ring
	104.		Bottom plate

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

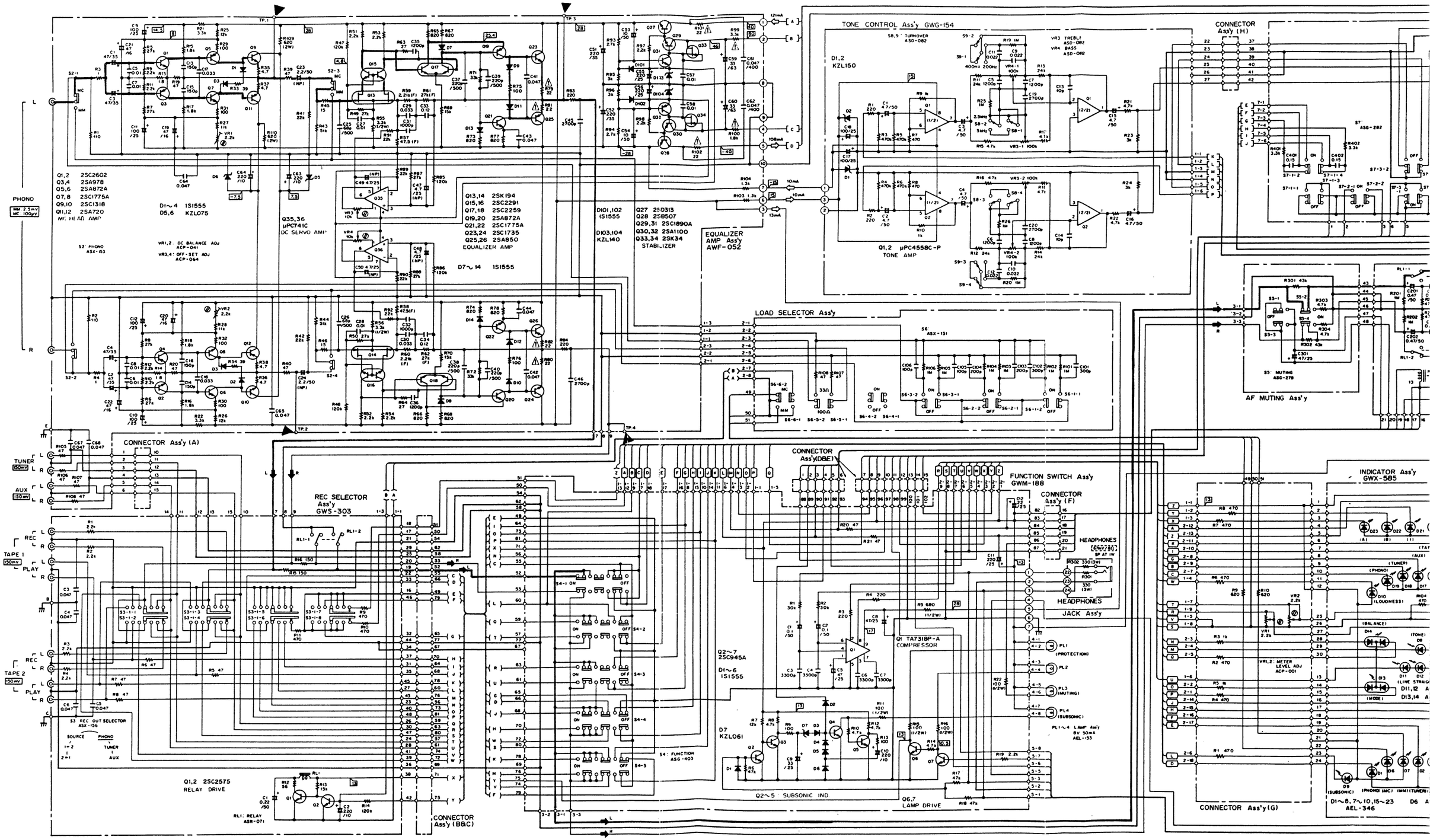
Interior Components

Mark	No.	Part No.	Description
	1.	VBZ30P060FMC	Screw 3x6
	2.	AEC-352	Nylon rivet
	3.	GWG-154	Tone control assembly
	4.	ABN-048	Washerfaced nut
★★	5.	ASX-154	Remote rotary switch
	6.	ABN-066	Union nut
	7.	GWM-188	Function switch assembly
	8.	ABA-261	Screw
	9.	ABN-046	Union nut
⚠ ★★	10.	ASG-535	Push switch(POWER)
	11.	BBT30P080FZK	Screw 3x8
	12.	ABA-214	Screw
★★	13.	AEL-153	Lamp assembly(4 lamps)
	14.	GWX-585	Indicator assembly
	15.	VBZ30P080FMC	Screw 3x8
	16.	AWR-226	Regulator assembly
⚠ ★★	17.	AEK-015	Fuse(T5A250V)
⚠ ★★	18.	AEK-402	Fuse(T1A250V)
	19.	VTZ40P080FMC	Screw 4x8
⚠ ★	20.	ATT-762	Power transformer
	21.	GWR-143	Power supply assembly
⚠ ★★	22.	AEK-405	Fuse(T1.6A250V)
	23.	WS50FMC	Spring washer 5φ
	24.	ABA-100	Screw 5x12
	25.	AWX-205	Capacitors assembly
	26.	GWX-593	Driver L assembly
	27.	GWX-594	Driver R assembly
	28.	ABA-258	Screw
⚠ ★★	29.	2SA1076/A/-B* (2SA1076/A/-G*)	*hfe should have the same value.
⚠ ★★	30.	2SC2526/A/-B* (2SC2526/A/-G*)	
	31.	AEC-488	Insulator wafer
	32.	GWS-303	REC selector assembly
	33.	AWF-052	EQ amplifier assembly
	34.	GWH-148	Power amplifier assembly
⚠ ★★	35.	AKX-057	Line voltage selector
	36.	VBZ30P120FMC	Screw 3x12
⚠	37.	AEC-327	Strain relief
⚠	38.	ADG-041	AC power cord(for HE type)
⚠		ADG-051	AC power cord(for HB type)
	39.	WG70FMC	Locking washer
	40.	B71-010	Nut M7
	101.		Side frame L
	102.		Connector assembly
	103.		Connector assembly
	104.		Holder
	105.		Remote belt
	106.		Balance control assembly
	107.		Connector E assembly
	108.		Switch assembly
	109.		Load selector assembly
	110.		Holder
	111.		Connector D assembly
	112.		Remote belt
	113.		Volume control assembly
	114.		Connector C assembly
	115.		Ground terminal 2-P
	116.		Slide plate
	117.		Sub-frame
	118.		AF muting assembly
	119.		Headphones jack assembly
	120.		Switch holder
	121.		Panel stay
	122.		Lamp holder A
	123.		Lamp holder B
	124.		P.C.B. holder B
	125.		P.C.B. holder C
	126.		P.C.B. holder D
	127.		P.C.B. holder E
	128.		Transformer frame
	129.		Shield cover A
	130.		Capacitors holder
	131.		Shield cover B
	132.		Wire saddle
	133.		Center frame
	134.		Heat sink
	135.		Holder A
	136.		Holder B
	137.		Clamp plate
	138.		Connector A assembly
	139.		Connector B assembly
	140.		P.C.B. holder A
	141.		Shield plate
	142.		Connector assembly

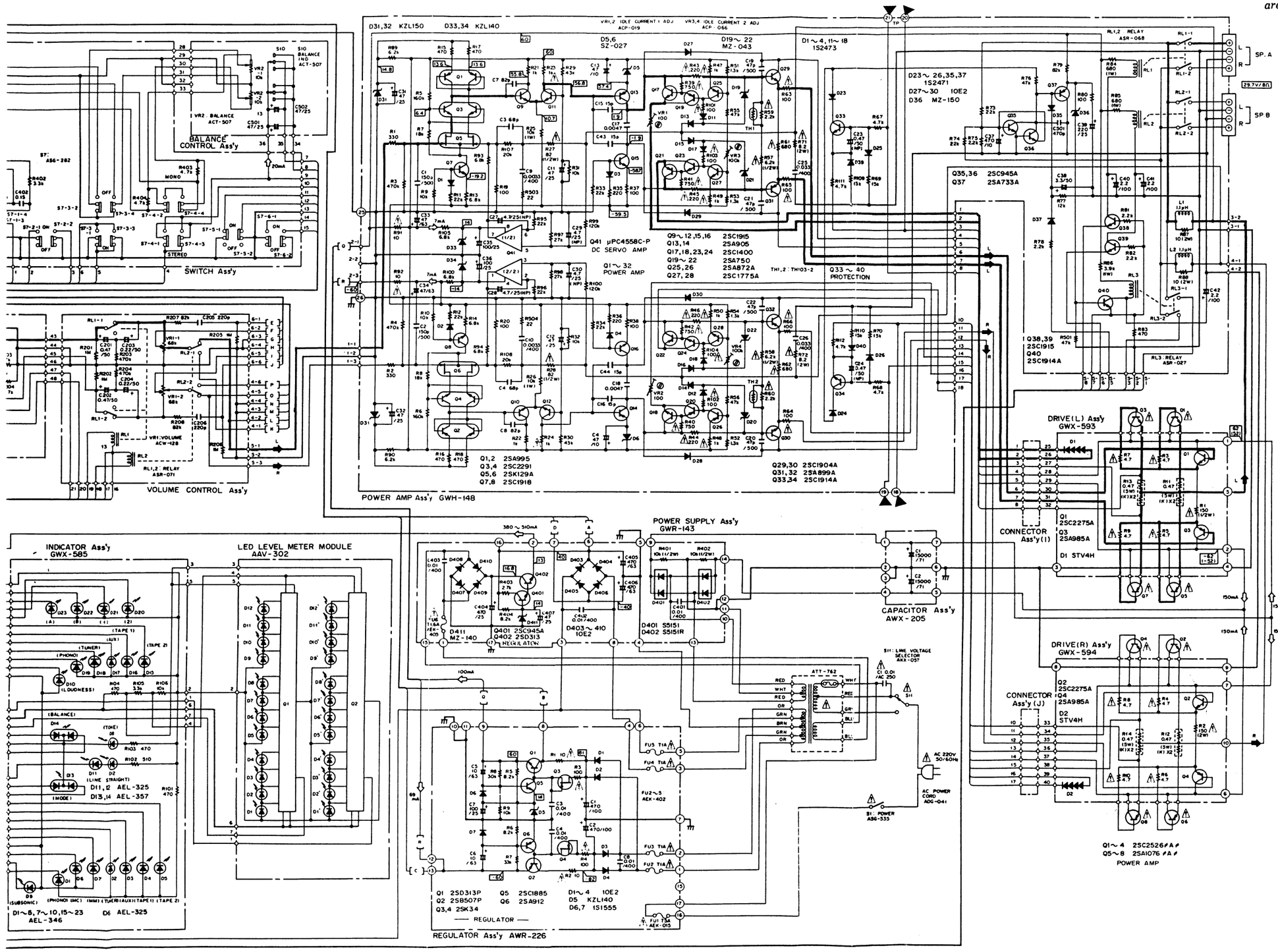


Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	143.		Connector assembly		148.		Shelf
	144.		Connector assembly		149.		Rear panel
	145.		Lever assembly		150.		Terminal(GND)
	146.		Plate		151.		Grounding plate
	147.		Terminal strip 2-P		152.		Side frame R

9. SCHEMATIC DIAGRAM



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



1. RESISTORS
Indicated in Ω, ¼W, ±5% tolerance unless otherwise noted k: kΩ, M: MΩ, (F): ±1%, (G): ±2%, (K): ±10%, (M): ± 20% tolerance

2. CAPACITORS
Indicated in capacity (μF)/voltage (V) unless otherwise noted p: pF
Indication without voltage is 50V except electrolytic capacitor

3. VOLTAGE, CURRENT
Signal voltage at 110 W + 110 W 8Ω output (1kHz)
DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power
⇦mA DC current at no input signal

4. OTHERS
➡ Signal route
⊘ Adjusting point
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

SWITCHES

S1	POWER	ON – OFF
S2	PHONO (SIGNAL)	MC – MM
S3	REC OUT SELECTOR	2→1→1→2 – SOURCE – PHONO – TUNER – AUX
S4-1	FUNCTION (PHONO)	ON – OFF
S4-2	FUNCTION (TUNER)	ON – OFF
S4-3	FUNCTION (AUX)	ON – OFF
S4-4	FUNCTION (TAPE 1)	ON – OFF
S4-5	FUNCTION (TAPE 2)	ON – OFF
S5	MUTING (-20dB)	ON – OFF
S6-1	MM LOAD (400p)	ON – OFF
S6-2	MM LOAD (300p)	ON – OFF
S6-3	MM LOAD (200p)	ON – OFF
S6-4	MM LOAD (100p)	ON – OFF
S6-5	MC LOAD	100Ω – 33Ω
S6-6	PHONO (IND)	MC – MM
S7-1	LOUDNESS	ON – OFF
S7-2	SUBSONIC FILTER (15Hz)	ON – OFF
S7-3	LINE STRAIGHT	ON – OFF
S7-4	MODE	STEREO – MONO
S7-5	SPEAKERS (A)	ON – OFF
S7-6	SPEAKERS (B)	ON – OFF
S8	TURNOVER (TREBLE)	2.5kHz – 5kHz
S9	TURNOVER (BASS)	400Hz – 200Hz
S10	BALANCE (IND)	ON – OFF
S11	LINE VOLTAGE SELECTOR	220V – 240V

The underlined indicates the switch position.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design

10. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 x 10¹*	*561*	*RD¼PS* 5 6 1 *J*
47kΩ	*47 x 10³*	*473*	*RD¼PS* 4 7 3 *J*
0.5Ω	*0R5*		*RN2H* 0 R 5 *K*
1Ω	*010*		*RS1P* 0 1 0 *K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 x 100*	*5621*.	*RN¼SR* 5 6 2 1 *F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number , temperature, humidity, etc.

Miscellaneous Parts

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
⚠ ★★	2SC2526/A/-B* (2SC2526/A/-G*)	Q1, Q3, Q5, Q7
⚠ ★★	2SA1076/A/-B* (2SA1076/A/-G*)	Q2, Q4, Q6, Q8

*hfe of Q1-Q8 should have the same value.

FUSES

Mark	Part No.	Symbol & Description
⚠ ★★	AEK-015	FU1 (T5A250V)
⚠ ★★	AEK-402	FU2-FU5 (T1A250V)
⚠ ★★	AEK-405	FU6 (T1.6A250V)

P.C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	GWH-148	Power amplifier assembly
	GWR-143	Power supply assembly
	GWG-154	Tone control assembly
	AWF-052	EQ amplifier assembly
	GWS-303	REC selector assembly
	GWM-188	Function switch assembly
	GWX-585	Indicator assembly
	AWX-205	Capacitors assembly
	GWX-593	Driver L assembly
	GWX-594	Driver R assembly
	AWR-226	Regulator assembly

OTHERS

Mark	Part No.	Symbol & Description
⚠ ★	ATT-762	T1 Power transformer (220V/240V)
⚠	ACG-001	C1 Ceramic capacitor (0.01/AC250V)
★★	AEL-153	PL1 Lamp assembly
⚠ ★★	ASG-535	S1 Push switch (POWER)
⚠ ★★	AKX-057	S10 Line voltage selector
⚠	ADG-041	AC power cord (for HE type)
⚠	ADG-051	AC power cord (for HB type)

Power Amplifier Assembly (GWH-148)

CAPACITORS

Mark	Part No.	Symbol & Description
	ACF-015	C1, C2 Mica (150p/500V)
	ACF-017	C19-C22 Mica (47p/500V)
	CCDSL 680J 50	C3, C4
	CCDSL 820J 50	C7, C8
	CCDSL 150J 50	C15, C16, C43, C44
	CQMA 472J 50	C17, C18
	CQMA 332K 400	C9, C10
	CQMA 333K 400	C25, C26
	ACH-318	C27-C30 Electrolytic (4.7/25V, NP)
	CEA 470M 25L	C11, C12, C31, C32
	CEA 470M 63L	C33, C34
	CEA 101M 25L	C35, C36
	CEA 470M 10L	C13, C14
	CEA 471M 10L	C37
	CEA 221M 25L	C39
	CEA 2R2M 100L	C40-C42
	CEA 3R3M 50L	C38
	ACH-356	C23, C24 Electrolytic (0.47/50, NP)
	CKDYB 471K 50	C501

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
★	ACP-019	VR1, VR2 Semifixed (100-B)
★	ACP-066	VR3, VR4 Semifixed (100k-B)
⚠	RD¼PMF □□□ J	R101-R104
⚠	RD¼PMFL □□□ J	R23, R24, R39-R50, R59-R66, R91, R92
⚠	RD½PSF □□□ J	R27, R28, R57, R58
	RS1P □□□ J	R25, R26, R84-R86
	RS2P 100J	R87, R88
	RN2P 8R2K	R71, R72
	RD¼PM □□□ J	R1, R2, R5-R22, R29-R38, R51-R56, R67-R70, R73-R83, R89, R90, R93-R100, R105-R112, R501, R503, R504
	RD¼PM □□□ JNL	R3, R4

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SA995	Q1, Q2
★★	2SC2291	Q3, Q4
★★	2SC1318	Q7, Q8
★★	2SC1915	Q9-Q12, Q15, Q16, Q38, Q39
★★	2SA905	Q13, Q14
★★	2SC1775A-E	Q27, Q28
★★	2SA872A-E	Q25, Q26
★★	2SC1400-E* (2SC1400-U*)	Q17, Q18, Q23, Q24
★★	2SA750-E* (2SA750-U*)	Q19-Q22

*hfe of Q17-Q24 should have the same value.

★★	2SK129A	Q5, Q6
★★	2SC1885	Q29, Q30
★★	2SA912	Q31, Q32
★★	2SC1914A	Q33, Q34, Q40
★★	2SC945A (2SC2575)	Q35, Q36
★★	2SA733A (2SA1100)	Q37
★★	μPC4558C-P (NJM4558DX)	Q41
★	1S2473 (1S1555)	D1-D4, D11-D18
★	1S2471	D23-D26, D35, D37, D39, D40
★	SZ-027	D5, D6
★	MZ-043	D19-D22
★	KZL150	D31, D32
★	KZL140	D33, D34
★	MZ-150	D36
★	10E2	D27-D30
★	TH103-2	TH1, TH2

OTHERS

Mark	Part No.	Symbol & Description	
★★	ASR-068	RL1, RL2	Relay
★★	ASR-027	RL3	Relay
	AKE-052	Terminal	(SPEAKERS)
	PMZ30P060FMC	Screw 3x6	
	VBZ30P060FMC	Screw 3x6	

Power Supply Assembly (GWR-143)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 471M 63L	C405, C406
	CEA 471M 25L	C404
	CEA 470M 25L	C407
	CQMA 103K 400	C401-C403

RESISTORS

Mark	Part No.	Symbol & Description
	RD¼PM272J	R403
	RD¼PM822J	R404
	RD½PS103J	R401, R402

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC945A (2SC2575)	Q401
★★	2SD313	Q402
★	S5151	D401
★	MZ-140	D411
★	10E2	D403-D410
★	S5151R	D402

OTHER

Mark	Part No.	Symbol & Description
	PMZ30P060FMC	Screw 3x6

Headphone Jack Assembly

Mark	Part No.	Symbol & Description
	RS3P 331J	R301, R302
	AKN-028	Phone jack (PHONES)

Regulator Assembly (AWR-226)

CAPACITORS

Mark	Part No.	Symbol & Description	
	ACH-343	C1, C2	Electrolytic (470/100V)
	CEA 100M 63L	C5, C6	
	CEA 101M 25L	C7	
	CQMA 103K 400	C3, C4, C8	

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
⚠	RD¼PMFL □□□ J	R1-R4
	RD¼PM □□□ J	R5-R9

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SD313P	Q1
★★	2SB507P	Q2
★★	2SC1885-R	Q5
★★	2SA912-R	Q6
★★	2SK34-D	Q3, Q4
★	10E2	D1-D4
★	1S1555 (1S2473)	D6, D7
★	KZL140	D5

OTHER

Mark	Part No.	Symbol & Description
	PBZ30P060FMC	Screw 3x6

Tone Control Assembly (GWG-154)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEANL 4R7M 50	C1-C4, C15, C16
	CEA 101M 25L	C17, C18
	CCDSL 100D 50	C13, C14
	CQMA 122J 50	C5-C8
	CQMA 272J 50	C19, C20
	CQMA 223J 50	C9-C12

RESISTORS

Mark	Part No.	Symbol & Description
★★	ASD-082	VR3, VR4 Variable (BASS, TREBLE)
		(S8) with switch (TURNOVER)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	μPC4558C-P (NJM4558DX)	Q1, Q2
★	KZL150	D1, D2

Load Selector Assembly

Mark	Part No.	Symbol & Description
	CQSA 301J 50	C101, C102
	CQSA 101J 50	C105, C106
	CQSA 201J 50	C103, C104
	RD¼PM 105J	R101-R106
	RD¼PM 470J	R107, R108
★★	ASX-151	S6 Remote push switch (MM/MC, CARTRIDGE LOAD)

Switch Assembly

Mark	Part No.	Symbol & Description
	CQMA 154J 50	C401, C402
	RD¼PM 472J	R403, R404
★★	ASG-282	S7 Push switch (LOUDNESS, SUBSONIC, LINE STRAIGHT, MODE, SPEAKERS)

Balance Control Assembly

Mark	Part No.	Symbol & Description
	CEA 470M 25L	C501, C502
★★	ACT-507	VR2 (S10) Variable resistor with switch (BALANCE)

AF Muting Assembly

Mark	Part No.	Symbol & Description
	CEA 470M 25L	C301
	RD¼PM 433J	R301-R302
	RD¼PM 472J	R303, R304
★★	ASG-278	S5 Push switch (MUTING)

Volume Control Assembly

CAPACITORS

Mark	Part No.	Symbol & Description
	CEANL R47M 50	C201, C202
	CCDSL 221J 50	C205, C206
	CEANL R22M 50	C203, C204

RESISTORS

Mark	Part No.	Symbol & Description
★	ACW-128	VR1 Variable (VOLUME)
	RD¼PM 105J	R201-R208

OTHERS

Mark	Part No.	Symbol & Description
★★	ASR-071	RL1, RL2 Relay

Connector Assembly

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description	
★	ACP-001	VR1, VR2	Semifixed (2.2k-B)
	RD¼PM □□□ J	R1-R10	

Indicator Assembly

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RD¼PM □□□ J	R101-R106

SEMICONDUCTORS

Mark	Part No.	Symbol & Description	
★	AEL-346	D1-D5, D7-D10, D15-D23	LED (Green)
★	AEL-325	D6, D11, D12	LED (Orange)
★	AEL-357	D13, D14	LED (Red/Green)
★	AAV-302		LED level meter module

OTHER

Mark	Part No.	Symbol & Description
	VBZ030P060FMC	Screw 3x6

EQ Amplifier Assembly (AWF-052)

CAPACITORS

Mark	Part No.	Symbol & Description	
	CEANL 470M 35	C1–C4	
	ACH-323	C23, C24	Electrolytic (2.2/50V, NP)
	ACH-318	C47–C50	Electrolytic (4.7/25V, NP)
	CEANL 470M 16	C19–C22	
	CEA 100M 50L	C53, C54	
	CEA 101M 25L	C9–C12	
	CEA 330M 63L	C60	
	CEA 221M 25L	C55, C56	
	CEA 221M 35L	C51, C52	
	CEA 221M 10L	C63, C64	
	CEA 330M 80L	C59	
	CQMA 333J 50	C17, C18	
	CQMA 103J 50	C5–C8, C27, C28	
	CQMA 122J 50	C35, C36	
	CQMA 473J 50	C41–C44, C65–C68	
	ACF-016	C25, C26	Mica (68p/500V)
	CKDYB 103K 50	C57, C58	
	CCDSL 151J 50	C13–C16	
	CCDSL 221J 500	C37–C40	
	CQMA 473K 400	C61, C62	
	CQPA 124G 50	C33, C34	
	CQPA 333G 50	C29, C30	
	CQPA 102G 50	C31, C32	
	CQSA 272J 50	C45, C46	

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description	
★	ACP-041	VR1, VR2	Semifixed (2.2k-B)
★	ACP-064	VR3, VR4	Semifixed (10k-B)
	RN¼PQ □□□□ F	R57–R62	
	RS2P 621J	R109, R110	
	RD½PS 332J	R55, R56	
⚠	RD¼PMFL 220J	R79–R82, R101, R102	
	RD¼PM 273JNL	R5–R8	
	RD¼PM □□□ J	R1–R4, R9–R54, R63–R78, R83–R100, R103–R108	

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC2602-G	Q1, Q2
★★	2SA978-G	Q3, Q4
★★	2SC1775A-E	Q7, Q8
★★	2SA872A-E	Q5, Q6
★★	2SC1318	Q9, Q10
★★	2SA720	Q11, Q12
★★	2SK194	Q13, Q14
★★	2SC2291	Q15, Q16
★★	2SC2259	Q17, Q18
★★	2SC1775A	Q21, Q22
★★	2SA872A	Q19, Q20
★★	2SC1735	Q23, Q24
★★	2SA850	Q25, Q26
★★	μPC741C (NJM4558DX)	Q35, Q36
★★	2SD313	Q27
★★	2SB507	Q28
★★	2SC1890A	Q29, Q31
★★	2SA1100 (2SA733A)	Q30, Q32
★★	2SK34-D	Q33, Q34
★	1S1555 (1S2473)	D1–D4, D7–D14, D101, D102
★	KZL075	D5, D6
★	KZL140	D103, D104

OTHERS

Mark	Part No.	Symbol & Description
	AKB-080	Terminal (PHONO)
	AKB-078	Terminal (TUNER, AUX)
★★	ASX-153	Remote slide switch (MM/MC)
	PBZ30P060FMC	Screw 3x6

REC Selector Assembly (GWS-303)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA R22M 50L	C1
	CEA 221M 25L	C2
	CQMA 473J 50	C3–C6

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RD¼PM □□□J	R1–R16

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC2575	Q1, Q2

OTHERS

Mark	Part No.	Symbol & Description
★★	ASX-156	Remote slide switch(REC SELECTOR)
	AKB-078	Terminal (TAPE)
★★	ASR-071	RL1 Relay

Function Switch Assembly (GWM-188)

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA 0R1M 50L	C1, C2
	CEA 470M 25L	C5, C8
	CQMA 332J 50	C3, C4, C6, C7
	CEA 330M 25L	C9
	CEA 221M 10L	C10
	CEA 221M 25L	C11
	CEA 220M 25L	C12

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RD½PS □□□J	R5, R11, R15, R16, R22
	RD¼PM □□□J	R1–R4, R6–R10, R12–R14, R17–R21

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	TA7318P-A	Q1
★★	2SC945A (2SC2575)	Q2–Q7
★	1S1555 (1S2473)	D1–D6
★	KZL061	D7

SWITCH

Mark	Part No.	Symbol & Description
★★	ASG-403	S4 Push switch (FUNCTION)

Driver R Assembly (GWX-594)

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
⚠	RD½PSF 151J	R2
⚠	RD¼PMF 4R7J	R4, R6, R8, R10
	ACN-114	R12, R14 Wire wound (0.47/5Wx2)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC2275A-Q* (2SC2275A-R*)	Q2
★★	2SA985A-Q* (2SA985A-R*)	Q4
	*hfe of Q2 and Q4 should have the same value.	
★	STV4H	D2

OTHER

Mark	Part No.	Symbol & Description
	PBZ30P060FMC	Screw 3x6

Capacitors Assembly (AWX-205)

Mark	Part No.	Symbol & Description
	ACH-210	C1, C2 Electrolytic capacitor (15000/71V)
	ABA-261	Brazier head screw

Driver L Assembly (GWX-593)

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
⚠	RD¼PMF 4R7J	R3, R5, R7, R9
⚠	RD½PSF 151J	R1
	ACN-114	R11, R13 Wire wound (0.47/5Wx2)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC2275A-Q* (2SC2275A-R*)	Q1
★★	2SA985A-Q* (2SA985A-R*)	Q3
	*hfe of Q1 and Q3 should have same value.	
★	STV4H	D1

OTHER

Mark	Part No.	Symbol & Description
	PBZ30P060FMC	Screw 3x6

11. ADJUSTMENTS

Power Amplifier

- Turn VR1, VR3 (L) and VR2, VR4 (R) fully around in the counter-clockwise direction.
- Without any load or input signal, turn the POWER switch ON.

Adjustment point	Prescribed value	Measuring terminals
VR1(L)	50mVDC	no. 21(+) and no. 20(–)
VR3(L)	75mVDC	
VR2(R)	50mVDC	no. 19(+) and no. 18(–)
VR4(R)	75mVDC	

Output Power Indicator Calibration

1. Set the LINE STRAIGHT OFF switch to OFF (LINE STRAIGHT) position.
2. Set the SPEAKERS selector to the A position, and connect an 8Ω resistor and AC voltmeter to the speaker output terminals.
3. Set the FUNCTION switch to the AUX position, and apply a 1kHz, 150mV signal to the AUX input terminals.
4. Adjust the VOLUME control for an AC voltmeter reading of 28V.
5. Adjust VR1 (L) and VR2 (R) on the connector assembly so that the all points of the output power indicators light at above 28V.

Preamplifier (EQ Amplifier Assembly)

- Without input signal, turn the POWER switch ON.

Adjustment point	Prescribed value	Measuring terminals
MC Amplifier DC Balance		
VR1(L)	0 ±30mV DC	TP1 and ground
VR2(R)	0 ±30mV DC	TP2 and ground
EQ Amplifier DC Balance		
VR3(L)	0 ±1mV DC	TP3 and ground
VR4(R)	0 ±1mV DC	TP4 and ground